



Management

FORECASTING INTERNATIONAL TOURISM DEMAND FOR ECUADOR

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Abstract

The international tourism demand for Ecuador was forecasted in this paper, with monthly data of foreign arrivals to Ecuador for the period 2000 to 2016. The Box-Jenkins model was applied, specifically the technique called ARIMA, in order to establish the best fit to the foreign arrivals from the monthly period from January to June of 2017. According to results, the model was not statistically significant, residual correlations problem was found.

Keywords: Box-Jenkins; Ecuador; Tourism Demand.

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1. Introduction

It is evidenced tourism help countries to grow, in the long run, as this sector stimulates many variables as, revenue, employment and investments.

Tourism provides foreign currencies and its effect is a positive impact on any economy, as increase local imports and keeps constant the foreign currency reserve level, but in the case of Ecuador that uses dollars, local tourism should be affected negatively if currency devaluation in the origin tourist country takes place.

According to the World Economic Forum Ecuador's tourism share of GDP is barely 5% in comparison with the global tourism share of GDP that is about 9.5%. Besides 1 of 11 employees are related with tourism worldwide, but in Ecuador is 1 of 20. The tourism service export in Ecuador is considered the third within the no oil revenue, but in has more tourist potential.

Colombia, Peru and United States represent about 70% of total tourist arrival, and the rest 30% it is from the rest of the world. This study through some autoregressive moving average models forecasted the foreign arrivals to Ecuador for the period from January 2017 to June 2017, from monthly data from 2000 to 2016.

Some studies had used foreign tourist arrival as a proxy for Tourism, like (Shareef and McAleer, 2007; Lim and McAleer, 2000; Lin et al., 2011). Others have used tourist expenses (Li et al., 2006; Sheldon. 1993; Syriopoulos. 1995; Downward and Lumsdon. 2003).

Long and short run relationships between tourism and some macroeconomic variables are also studied, but some of these variables cannot be measured and most studies use proxy variables (Lim. 2000; Song et al., 2003), in tourism model studies, income and prices are the most explanatory variables used. Leisure tourism is considered as a luxury good, though this variable would be difficult to measure. Most studies rely on the use of nominal or real GDP or GDP per capita, as more income people have, they are likely to travel more. More specifically, some researchers have applied the industrial output index for proxy GDP as this can be measured monthly (Gonzales and Moral. 1995; Seo et al., 2009), these last two studies concluded that the index has a positive relationship with tourist arrivals.

Some specific index, like the relative hotel price index (Narayan, 2004) or others to measure the impact on tourist expenditure or cost of living in the destination country has been included, but this this kind of specific indices had not improved results from the relative price index (Martin and Witt, 1987). Tourism Price is calculated adjusting the variable by relative prices (Habibi and Rahim, 2009; Narayan, 2004).

The exchange rate is also taken into account (Halicioglu, 2010; Habibi and Rahim, 2009). According to (Artus, 1972) tourists respond quickly to changes in exchange rate instead of relative inflation, but (Martin and Witt, 1987) argued that the exchange rate alone does not capture impacts on tourism, for this, many studies use real exchange rate.

Transport and tourist accommodation is also used (Louca, 2006). Transportation is not yet measured to calculate the cost of transportation of tourists, some tourists travel by car using gasoline; meanwhile others use airplanes (Narayan, 2004). I use the variable oil price instead of transportation (Crouch, 1994). But it could show the multicollinearity problem as oil price and income present similar changes. (Lim, 1999); these issues can be fixed by using dummy variables.

Other variables have jointly been studied to measure the impact on tourism, variable like domestic consumption (Jackman and Lorde, 2010), number of people under the poverty line (Croes and Vanegas, 2008), industrial good imports (Nowak et al., 2007); direct foreign investment (Tang et al., 2007); exports and imports (Khan et al., 2005), also political unrest and recessions would affect the demand of tourism (Loeb, 1982).

All these studies have concluded there is a long run relationship, using ordinary least squares and advanced econometric methods like autoregressive lag models and error correction models, also they proved that tourism it is a relevant economic variable.

Tourism it is related to some macroeconomic variables, as it is expressed above, there are many techniques to forecast, but one very popular, it is the econometric technique called the ARIMA model, developed by Box and Jenkins (1976).

Geurts, Buchman and Ibrahim, (1976); Petrevska, (2015); Bigović, (2012); Saayman and Saayman; (2010); Haridev, (2013); Baldigara and Mamula (2015); Akuno, et al (2015); Song, H., Wong, K., & Chon, K. (2003) and Koutras et al (2016) used an ARIMA model to forecast the behaviour of tourism in the short run.

2. Materials and Methods

It is evidenced tourism help countries to grow, in the long run, as this sector stimulates many variables as, revenue, employment and investments.

Tourism provides foreign currencies and its effect is a positive impact on any economy, as increase local imports and keeps constant the foreign currency reserve level (McKinnon, 1964) but in the case of Ecuador that uses dollars, local tourism should be affected negatively if currency devaluation in the origin tourist country takes place.

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3. Results and Discussions

3.1. Unit Root Test

Dickey and Fuller (1981), have computed the critical values of the t-statistic based on Monte Carlo simulations. This t-statistic is known as the Dickey-Fuller (DF) test, which does not follow the usual t-distribution. DF test is estimated using three different equations: With intercept, prone and Intercept and random walk). In each case, the null hypothesis is that there is a unit root. (Agung GN, 2009) The DF tests assume that the errors are independent and have a constant variance. (Enders, 2015).

Variable was subjected to a unit root test. Both the Dickey-Fuller Augmented Test (ADF) and the Phillips-Perron (PP) test (Phillips and Perron, 1988) showed serie had a unit root in levels, but at first difference it did not have unit root either intercept or with tendency and intercept at 1%.

The ARIMA model is applied to data, assuming data is not stationary, as PP and DF tests determined. According to results the best model with the lowest AIC was ARIMA (5,1,0). Coefficients are showed below.

Table 1: ARIMA Model (5,1,0) with drift, Author's

ar1	ar2	ar3	ar4	ar5	drift
-0.5401	-0.7645	-0.594	0.7245	-0.4	365.1601
0.0646	0.0553	0.0648	0.0548	0.0659	162.4712

3.2. Diagnostic Test

Autocorrelation problem in residuals are a common issue in no stationary data in ARIMA models, results suggest that the model (5,1,0) with drift, has autocorrelation problem. According to the Box-Lung test and the ACF and PACF graphs. The P-value of the Box-Lung test was 0.00, conluding there is a autocorrelation problem in calculated results. The graphs tests are shown below, these two tests are in agree with the Box-Lung test.

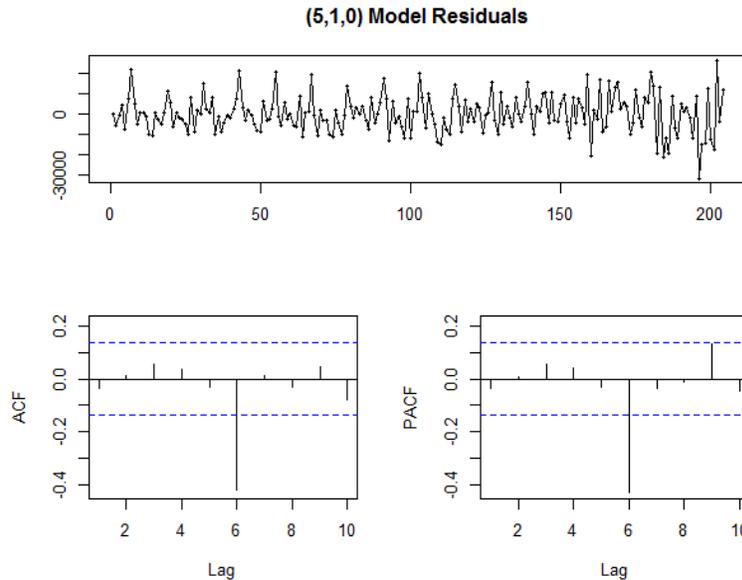


Figure 1: ACF and PACF test, Author's

4. Conclusion

The long run economic relationship of the tourism demand model for Ecuador was carried out in (Paladines, 2017), using variables as the number of arrivals, the income of the origin country of the tourist, proxied by industrial or production index, tourism price, it was concluded that the

more income, more leisure expenditure for tourism (Gonzales and Moral, 1995; Seo, et al., 2009; Halicioglu, 2010; Song et al., 2003).

In this paper the model ARIMA was applied to the number of arrivals, in order to be able to do a short run or a long run forecast for tourism. The model chosen was ARIMA (5,1,0). The model developed showed itself no statistically significant, as results suggested autocorrelation problem, any forecast operation will be invalid, as the assumption of autocorrelation is violated.

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